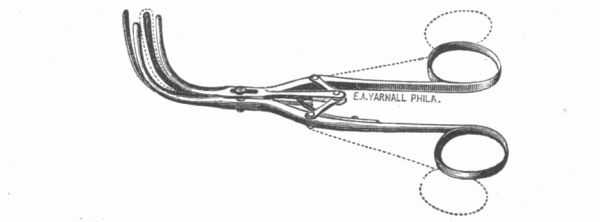
and sufficiently free. On careful examination you will find the mucous membrane adhering closely to the entire surface of the glans penis. When circumcision is performed the cutting off of the redundant foreskin does not remedy this trouble referred to, nor can the prepuce be retracted without first tearing or splitting up the mucous membrane.

What is sought after for the health and comfort of the boy is easy retraction of the prepuce so that cleanliness of the organ can be secured, and all irritating matter that has accumulated around the corona may be removed.

This I have found by experiment can readily be accomplished almost invariably as a bloodless operation, by a careful stretching of the mucous membrane with an instrument that I have devised for the purpose, which with its four expanding blades stretches the parts equally and at the same time gradually breaking up the adhesions until we uncover the anterior portion of the glans, when we are obliged to resort to the blunt end of a probe to dissect off from the glans as far back as the corona the tightly adherent membrane.



On so doing we will come across here and there over the glans small particles of hard granular substances about the size of a pin's head which have become embedded between the mucous membrane and the glans, acting as foreign bodies, and of course a source of great discomfort. When the corona is reached we generally find a layer of smegma filling the entire indenture of this part of the organ. This carefully removed, the parts oiled with some wholesome unguent, and the foreskin drawn forward the operation is complete, without a drop or at the most with only a few drops of blood, and without the necessity of a stitch or the application of any special dressing.

I will endeavor to give you an occular demonstration of my method of procedure in this operation. First, as the operation is only momentary I will not require to subject the child to the risk of an anæsthetic. But as a substitute I sometimes use a 10 per cent. solution of cocaine, applying it over the mouth of the prepuce, which results in a painless operation. After the cocaine has taken effect having placed the boy on his back on a table, we will take our position on the right side of the boy and table and with left thumb and forefinger we will grasp the side of the prepuce whilst we take the instrument in the right hand. The assistant will stand on the opposite side of the table, and will also grasp the opposite side of the prepuce and stretch it upwards and apart as much as possible to enable the instrument to be inserted into the opening. Having passed the instrument as far as possible into the orifice of the prepuce we must be careful to avoid the meatus as the urethra might be lacerated by mistake. In expanding the blades of the instrument, which I have named the "Preputial Dilator," much care must be exercised in order that the prepuce is not too suddenly and extensively stretched, so as to avoid tearing either mucous membrane or skin, for if such should happen the success of the operation is not nearly so satisfactory. It would be much better to repeat the process cautiously from time to time until thoroughly accomplished, than to be rash at the first, as it is very evident that during the healing process the tendency of the parts is to contract and therefore reëstablish the original trouble.

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EFFECTS OF OBLIQUITY OF THE CORRECTING LENS TO THE VISUAL AXIS.

Read in the Section on Ophthalmology, Otology and Laryngology, at the Thirty-Eighth Annual Meeting of the American Medical Association, June, 1887.

BY EDWARD JACKSON, A.M., M.D.,

ADJUNCT PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLICLINIC.

The effect of a spherical lens upon a pencil of light-rays entering it obliquely has been carefully studied by Prof. E. C. Pickering and Dr. Charles H. Williams, who have recorded the results of their investigations in the *Proceedings of the American Academy of Arts and Sciences*, Vol. 10, 1874–5, p. 300. Dr. G. Hay, in a paper "On the Increase of Refractive Power of a Plano-Cylindrical Lens when Rotated about its Axis," in the *Transactions of the American Ophthalmological Society* for 1875, p. 319, has given the results of a similar study with reference to cylindrical lenses.

In these papers the mathematical questions arising in connection with this subject are clearly and exhaustively discussed. But the only practical applications made of the law developed, is, in the former paper, a reference to its importance in the correcting of wide-angle photographic lenses, and in the latter, the suggestion of an apparatus for the measurement of astigmatism. A recent paper on the subject in the *American Journal of Ophthalmology*, by Dr. S. M. Burnett, equally neglects the extremely important practical aspect of the subject.

Briefly, the placing of a lens so that the incident pencil of rays enters it obliquely increases its refractive power. The cylindrical lens acts simply as a stronger cylindrical lens; but with the spherical lens the increase of refractive power is greatest in the meridian in which the obliquity is measured, so that it comes to act as a sphero-cylindrical lens, with one principal meridian in the direction of the obliquity, and the other perpendicular to it. Thus, if a convex lens is revolved about a vertical axis so that a pencil of horizontal rays strikes it obliquely, its effect upon the pencil will be that of a stronger convex spherical lens combined with a convex cylindrical lens with its axis vertical.

Tables showing the effect of given degrees of obliquity are given by Pickering and Williams. I have

confirmed the approximate accuracy of these tables both by calculation and empirical tests. They are sufficiently accurate for all practical purposes, with glass having a refractive index 1.54, which is about that of the glass used for spectacle lenses.

The following table, based upon the data of Pickering, and Williams, and Hay, gives in the first column the various degrees of obliquity up to 40°. In the second is shown the effect on a 1 Diopter cylindrical lens; while the third gives the sphero-cylindrical effect of a 1 Diopter spherical lens equally inclined to the axis of the incident pencil:

Obliquity of the Lens.	Refractive Power of a 1 D. Cylindrical Lens so Placed.	Sphero-Cylindrical Equivalent of a 1 D. Spherical Lens so Placed.
0°	1. D. cyl.	1. D. spherical.
5°	1.01 "	1.00 sph. ◯ 0.01 cyl.
10°	1.04 "	1.01 sph. ◯ 0.03 cyl.
15°	1.10 "	1.02 sph. ◯ 0.08 cyl.
20°	1.17 "	1.04 sph. ◯ 0.13 cyl.
25°	1.30 "	1.06 sph. ◯ 0.24 cyl.
30°	1.44 "	1.09 sph. ◯ 0.36 cyl.
35°	1.69 "	1.12 sph. ◯ 0.56 cyl.
40°	2.01 "	1.16 sph. ◯ 0.83 cyl.
45°	2.46 "	1.22 sph. ◯ 1.24 cyl.

It may be noted with reference to this table that the cylindrical effect increases more than the spherical, and that both increase more rapidly the higher the degree of obliquity.

For instance, a 10. D. spherical lens with an obliquity of 10° shows an accession of spherical refraction of only one-tenth of 1 D., and of less than one-third D. of cylindrical effect. But making the angle three times as great, 30°, the spherical is increased almost 1. D., and the cylindrical amounts to more than three and a half D.

Dr. Thomas Young proposed to correct his own compound myopic astigmatism by the proper spherical lens placed obliquely before his eye. Evidently such an arrangement is only possible when the spherical lens employed is considerably stronger than the cylindrical effect required. It has, however, been resorted to from time to time by those using strong convex or concave spherical lenses. The device being generally accidentally discovered by the wearer of the glasses, who finds that by holding the object in a certain position, that is, so that his visual axis and the pencil of incident rays shall strike his glass with a certain degree of obliquity, that he can see it more distinctly than anywhere else.

Within a month I was consulted by an old gentleman whose left eye was useless, with a pterygium extending on to the inner portion of the cornea of the right. He read with a convex 5. D. spherical, holdir g the page very close to his face, and so far to the left that he could barely see it above the bridge of his nose.. In this way he was able to very nearly correct the 3.50 D. of hyperopic astigmatism, axis vertical, which I found on examination. This method of correcting astigmatism is, however, quite inferior to the use of the sphero-cylindrical lens. Because, unless the amount of astigmatism is so slight as to make its correction very unimportant, the glass must be so much inclined that a very slight difference in the inclination will greatly vary the cylindrical effect, making it necessary to always bring the object to a certain position in order to see it clearly; and thus greatly narrowing the available field of vision. Suppose a patient had a compound myopic astigmatism requiring for its correction a — 3. s ◯ — 1. cyl. axis 180°. With such a lens the patient could turn his visual axis 15° from the perpendicular to the lens, either to the left or right, or up or down, giving a field of vision of 30° in any meridian without seriously changing the refractive effect of his glass. But if, as myopes not rarely do, he obtained his cylindrical effect by canting the lenses forward, he would have to make their obliquity to the visual axis equal 30°; in which case a deviation of the axis 5° either upward or downward will very greatly impair the accuracy of his correction.

When we find a patient who can see better by looking through his glasses obliquely, we should never rest with that correction; but by the aid of the table given above, and careful testing, should search out the sphero-cylindrical equivalent of the obliquely placed lens; and give the patient the benefit of the larger, accurately corrected, visual field; and the lesser liability to transgress its limits.

Among systematic writers I believe Landolt alone has directed attention to the importance of care as to details in the mounting of lenses before the eye; and he has by no means exhausted the subject, especially in this direction. The greater care to avoid undesired cylindrical effects is of course needed with the stronger lenses. For distant vision the lens is to be mounted with its surfaces nearly coincident with the plane of the face, making due allowance for any peculiar habit of position; while for near work, done at a lower level than the eyes, the front surface should look downward and forward.

Where a single lens is used for both near and distant vision, its position must lie midway between what would be the best positions for either near or distant visions alone. Here the advantages of strongly periscopic lenses would be manifest. The perfect periscopic lens, in this respect, would be one having the centres of curvature for both its anterior and posterior surfaces as close as might be to the centre of rotation of the eye. Sometimes where the one lens must be habitually used with the visual axis in widely varying positions, it may be worth while even where there is no astigmatism, to add a weak cylinder, with its axis corresponding to the plane in which the visual axis moves, in order to correct the cylindrical effect that will be caused at right angles to this. When bifocal or divided lenses are employed their position should also be between the proper positions for near and distant vision. But instead of midway between should be much nearer the proper position for the stronger glass. Thus with convex bifocals the glass for near work being the stronger, they should look more downward; with concaves the distance glass being the stronger they should look more forward. Better still, as has some-

times been done, they may be mounted in a frame which has an angle where the two parts come together, so that each may be given just its proper direction.

But perhaps the most important practical lesson to be learned, from a study of the effects of obliquity of the correcting lens, is an illustration of the necessity for accuracy in the determination and correction of ametropia particularly of myopia. To place before an eye a lens that does not accurately meet its needs, may by inducing the patient to look obliquely through it, and so to encounter the cylindrical effect, prove quite disastrous for the patient.

Chas. J., æt. 21, came to me recently with evidences of eye-strain, headache, pain in the eyes, choroidal congestion and commencing conus. He was wearing right and left —4. D spherical that I had ordered for him four years ago and which had been worn most of that time with comfort. But he now believed he had some astigmatism; saw with different degrees of distinctness, lines running in different directions. *To see clearly objects a little way from him, he would twist his head to one side and look obliquely through his glasses.* This maneuver gave him V. $= \frac{15}{XV}$ mostly; while looking directly forward he saw but $\frac{15}{XX}$ partly. Under a mydriatic his symptoms of eye strain promptly disappeared; it was found that during the four years his myopia had increased 0.75 D. in each eye. Such an increase may have been due to a strictly physiological development of the globe; but the effort to see clearly with his imperfect correction caused all the symptoms of an aggravated astigmatism. The obliquely placed lens caused an astigmatism of the incident pencil which varied continually and allowed the establishment of no constant compensatory accommodative effort.

I fear that many ophthalmologists regard it as a small matter to leave a little myopia uncorrected, or think it rather a good thing to do, because it saves a little effort of accommodation. I believe that for reasons above indicated it is dangerous; and could detain you longer with the citation of cases that would illustrate and enforce my point. As spectacle lenses are usually fitted and mounted, it is quite possible to get by looking through the edge of the lens an obliquity of the incident pencil either upward or downward of 25° or 30°, and to the right or left of from 30° to 40°. Now a glance at the table will indicate how much increase of spherical refraction accompanied by astigmatism can be obtained, by such an obliquity, with a strong lens. And if, as many, especially Thomson and Green, have argued, astigmatism be especially dangerous to the myope; it cannot be doubted but that the temptation to thus secure better distant vision is also very dangerous.

The myope with a partial correction shares this danger, with the presbyope whose glass is insufficeint for near work and who strives to shorten its focus by looking through it obliquely; and the two constitute the best and most common examples of the dangers of using lenses not wisely selected.

Another very practical application of our knowledge in this direction, is in warning patients, especially such as use strong lenses, always to look through the center of the glass. And in this law governing the action of lenses we may find a partial explanation of that difficulty which Landolt so graphically portrays, in satisfying our cataract patients with the optical substitute for the crystalline lens.

PATHOLOGICAL CONDITIONS OF THE TEETH AND THEIR SYSTEMIC EFFECTS.

Read before the Section of Dental and Oral Surgery, at the Thirty-Eighth Annual Meeting of the American Medical Association, June, 1887.

BY K. B. DAVIS, M.D.,
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This subject is one of great importance, not only to the dentist but to the oculist and the general practitioner of medicine. Important as it is, however, it has not heretofore received that attention from medical writers, and practitioners that it justly merits. That pathological conditions of the teeth and the structures adjacent to them in the oral cavity, do exert a most pernicious influence upon the general system, is a fact as well established as any other medical observation. Yet I fear there are too many practitioners that almost wholly ignore these conditions as causes of many systemic disturbances.

The attention of the profession was recently called to this subject, by the New York *Medical Record*, in which Dr. Samuel Sexton, a distinguished oculist and aurist of New York City, and the editor of the *Record*, were the principal writers.

The *Medical Record* of October 4, 1884, contains a report from the aural service of Dr. Sexton, entitled "Pain in the Ears, due to Irritation in the Jaws." He describes a number of cases of otalgia, in which he found the lesion to be in diseased teeth.

The same number of the *Medical Record* contains an editorial on "Dead Teeth in the Jaws," which reads as follows: "Perhaps the time is near at hand when medical men should be themselves better informed concerning diseases of the jaws and mouth, rather than refer the ailments of this region to individuals whose limited knowledge of medicine does not prevent them from "treating" dead teeth long after their presence in the jaws has given rise to alveolar abscesses and neuralgias, more or less painful. It would not be strange if in the course of events, the day would soon come when all teeth without pulps, and hence, in process of more or less rapid decay, as well as those which the deposit of tarter or other cause, had entirely divested of periosteal nourishment, would be promptly condemned as unfit to remain in the jaws—regarded in fact as foreign bodies, liable to give rise, not only to cerebral irritation and diseases in the organs of special sense, through the propagation of local disturbances in the mouth, to the regions mentioned, but to endanger likewise the general health, through purulent matter discharged into the mouth from alveolar abscesses, to be continuously swallowed for a long time, or, indeed, in some instances, to be absorbed, and thus produce septicæmic poisoning. It is certainly grati-